ABSTRACT OF THE DISCLOSURE

A system and method for increasing channel capacity in fiber-optical communication networks utilizing space and time modulation. The system utilizes a three-dimensional spatial field of time division multiplexing, polarization modulation, and wavelength division multiplexing to increase channel capacity. A plurality of transmitter data processors receive a plurality of channel inputs for transmission over the optical network. The transmitter data processor produces time division multiplexing of a plurality of data channel inputs into a plurality of temporal and spatial data streams. A plurality of optical sources receive and directly modulated by the plurality of temporal data streams which are then polarization modulated before being delivered to a wavelength division multiplexer for transmission over an fiber-optics cable. The fiber-optics cable delivers the wavelengths to a wavelength division demultiplexer for subsequent polarization demodulation, photo-detection of the plurality of temporal data streams which are then delivered to a receiver data processor for time division demultiplexing of the temporal data. One variation is using an optical cross-connect to reuse wavelengths. The system can also be applied to ring networks, star coupler networks and data bus networks that are comprised of multiple network interface units communicating over an optical fiber.